

1966 OPERATING SUMMARY

FERGUS

water pollution control plant

TD227
F47
W38
1966
MOE

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ONTARIO WATER RESOURCES COMMISSION
Division of Plant Operations

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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Fergus Local Advisory Committee,
Town of Fergus.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the
Fergus Water Pollution Control Plant, OWRC Project No. 58-S-23.

It is hoped that our joint participation in efforts to combat water pollution
will have even more success in the coming year.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,
General Manager.

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NOV 23 1967

ONTARIO WATER
RESOURCES COMMISSION

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W38
1966
MOE

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ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET
TORONTO 5

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VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Fergus
Water Pollution Control Plant, OWRC Project No. 58-S-23.

The report offers a concise summary of operating data for the year and
comparisons with previous years where these are applicable and significant.

Yours very truly,

A handwritten signature in cursive script, appearing to read "B. C. Palmer".

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

C O N T E N T S

Foreword	1
Title Page	3
'66 Review	5
Project Costs	6
Operating Costs	7
Process Data	9
Conclusions	Inside back cover



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FERGUS
water pollution control plant

operated for

THE TOWN OF FERGUS

by the

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Assistant Director:	C. W. Perry
Regional Supervisor:	D. A. McTavish
Operations Engineer:	B. W. Hansler

801 Bay Street

Toronto 5

'66 REVIEW

A total of 219,048 million gallons of sewage was treated at the Fergus Water Pollution Control Plant during the year at a total operating cost of \$20,582.17. The operating cost per million gallons was \$93.96 and the cost per pound of BOD removed was \$0.04.

The average daily flow recorded at the plant was 0.600 million gallons. Flows in excess of 1.0 MGD are by-passed to the chlorine contact chamber before reaching the plant flow meter. The plant design flow of 0.6 MGD was exceeded 43% of the time during 1966.

The raw sewage BOD concentration, averaging 250 ppm, exceeded the design value of 200 ppm 62% of the time. The raw sewage suspended solids concentration, averaging 173 ppm, exceeded the design value of 200 ppm 37% of the time. The final effluent BOD and suspended solids concentrations exceeded the OWRC objective of 15 ppm 33% of the time. The average BOD and suspended solids reduction efficiencies were 94.0% and 92% respectively.

In the summer, a process water system utilizing plant effluent was installed. Since the major portion of the water used at the plant is used for chlorination of the effluent and for washing down equipment. Savings similar to that for the latter part of the year can be anticipated.

Repairs to the roof and piping necessitated the emptying of the digester. From February until the end of September no sludge was being added to the digester, therefore no appreciable amount of gas was produced. Since the digester was not in operation for most of the year, a large quantity of raw sludge was handled.

During the latter part of the year arrangements were made for the joint operation of the Fergus and Elora Water Pollution Control Plants, utilizing the OWRC staff at Fergus. This arrangement for joint operation reduced the salary costs for both participating plants.

Under the supervision of head office engineers, the plant staff has operated a clean, attractive and efficient plant for the Town of Fergus.

PROJECT COSTS

NET CAPITAL COST (Final) (Long Term Debt to OWRC)	\$ <u>277,393.48</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	\$ <u>72,108.24</u>
Net Operating	\$ 20,582.17
Debt Retirement	10,064.00
Reserve	1,705.60
Interest Charged	<u>15,606.78</u>
TOTAL	\$ <u>47,958.55</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 9,515.59
Deposited by Municipality	1,705.60
Interest Earned	<u>449.81</u>
	\$ <u>11,671.00</u>
Less Expenditures	<u>3,461.07</u>
Balance at December 31, 1966	\$ <u>8,209.93</u>

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	1600.86	736.30		99.43	117.13		20.76			360.37	266.87
FEB	1587.03	707.90		198.41	112.67	224.03	45.06		28.51	270.45	
MARCH	2053.38	736.30		102.05	91.91		72.69		70.65	979.78	
APRIL	2387.43	1161.46			83.55	448.06	47.59		136.19	247.17	263.41
MAY	1281.66	777.12			83.55	30.67	70.47			319.85	
JUNE	1720.55	846.33		103.22	83.55		53.80	75.52	89.85	468.28	
JULY	1838.19	766.88			91.91	228.38	60.16	30.04	164.10	304.26	192.46
AUG	1628.68	733.47			121.39	228.38	23.86		43.56	478.02	
SEPT	1561.20	1085.61			83.55		26.61	7.64	100.00	257.79	
OCT	1445.82	809.86			96.36	53.15	51.53		79.12	347.70	8.10
NOV	1825.35	702.06		289.38	98.43	228.38	30.26		140.00	336.84	
DEC	1652.02	554.32		188.92	118.30	228.38	122.20	45.20	270.24	114.46	
TOTAL	20582.17	9627.61		981.41	1182.30	1669.43	624.99	158.40	1122.22	4484.97	730.84

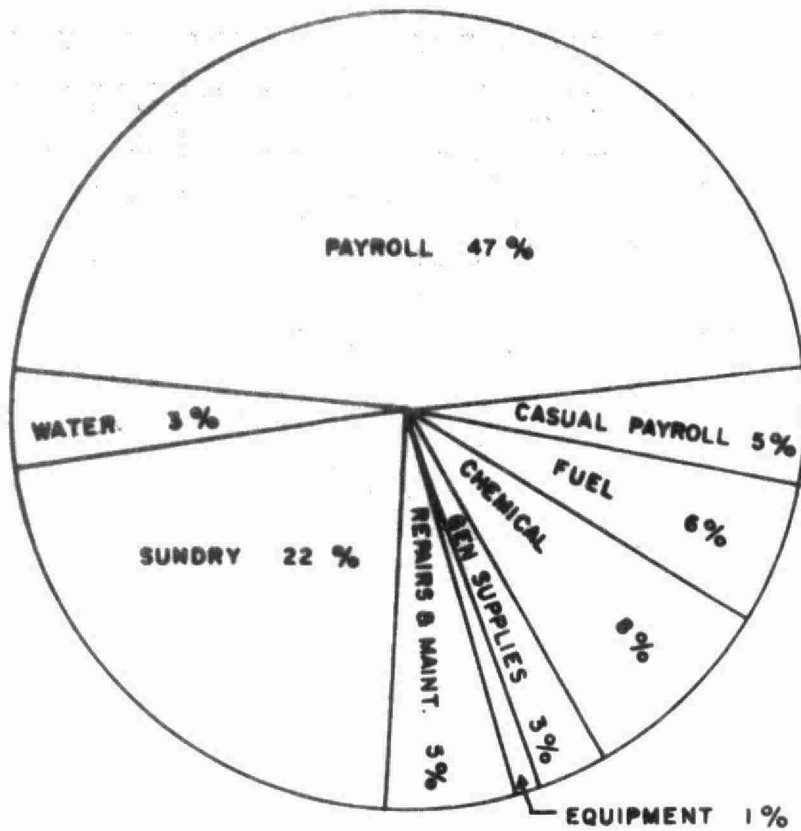
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$3,615.13
BRACKETS INDICATE CREDIT

YEARLY OPERATING COSTS

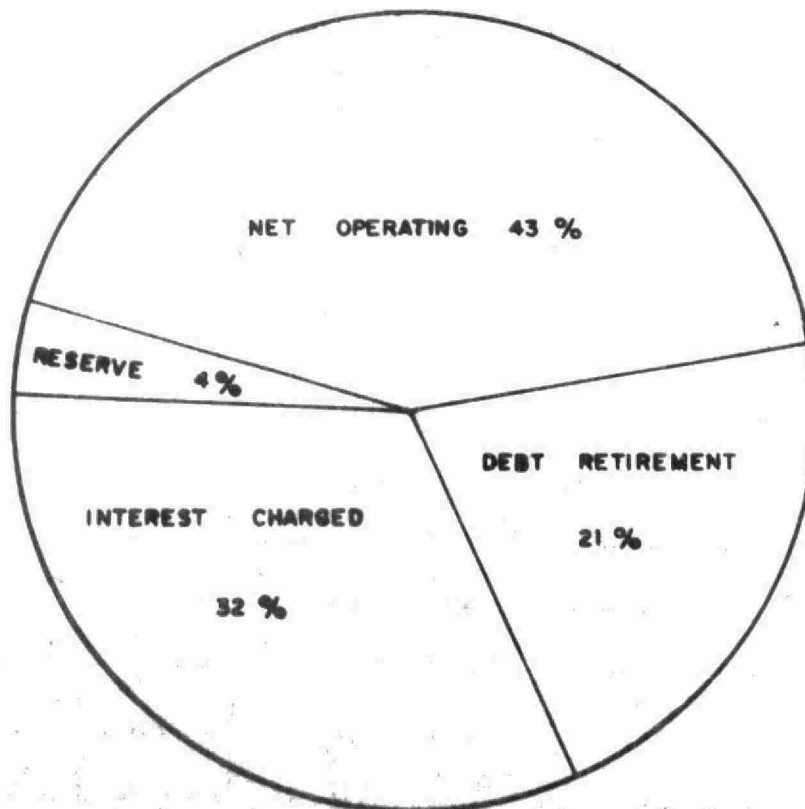
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	118.82	\$11201.00	* \$11.04	\$ 94.25	6 CENTS
1962	106.77	12021.00	11.86	112.50	4 CENTS
1963	143.12	12730.66	12.56	88.83	5 CENTS
1964	180.12	19881.89	19.19	110.37	4 CENTS
1965	208.34	21760.15	21.02	104.45	3 CENTS
1966	219.048	20582.17	18.52	93.96	4 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

1966 OPERATING COSTS



TOTAL ANNUAL COST



Process Data

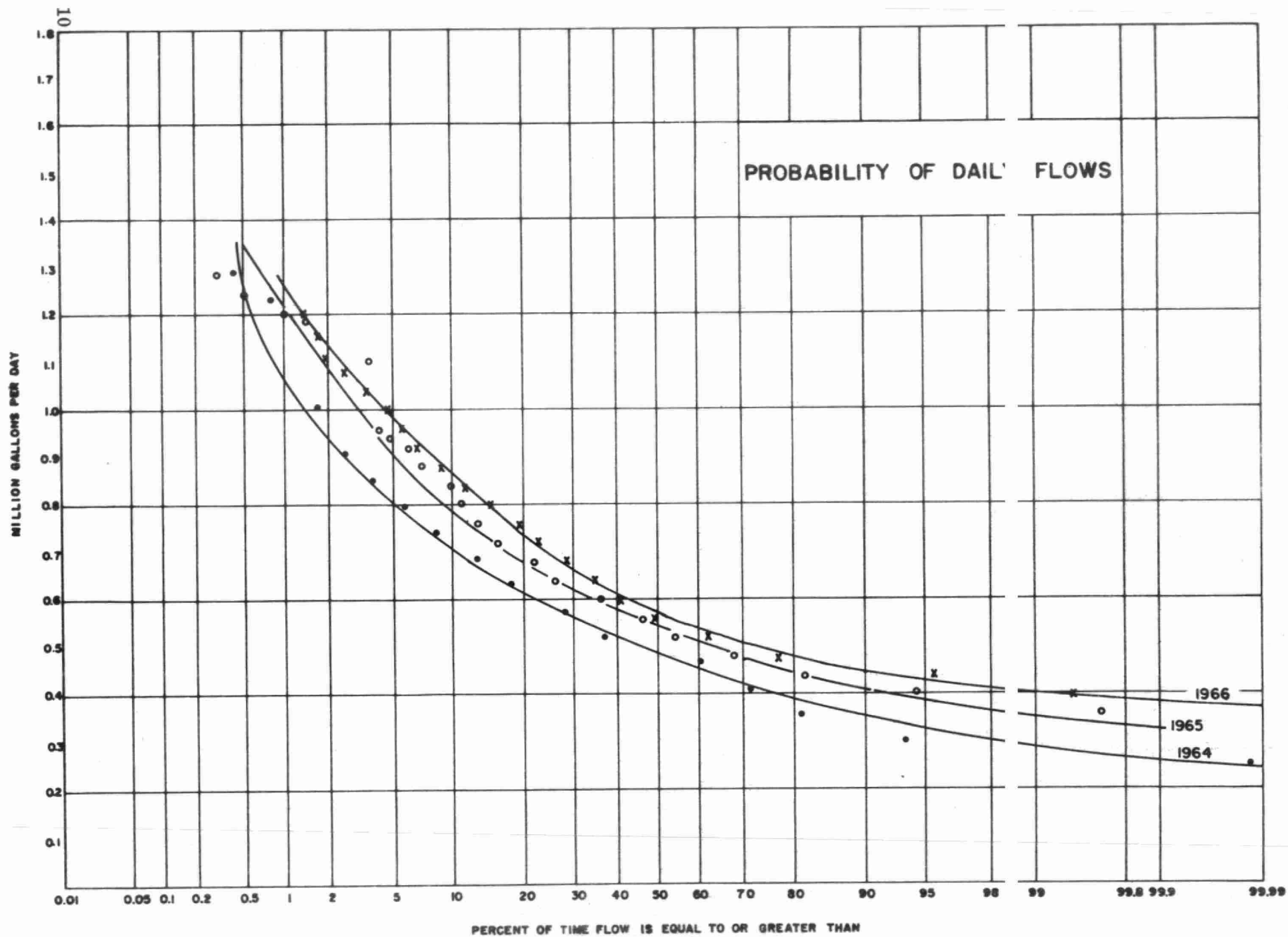
From the graph of the average daily flows, there is an evident trend to higher flows.

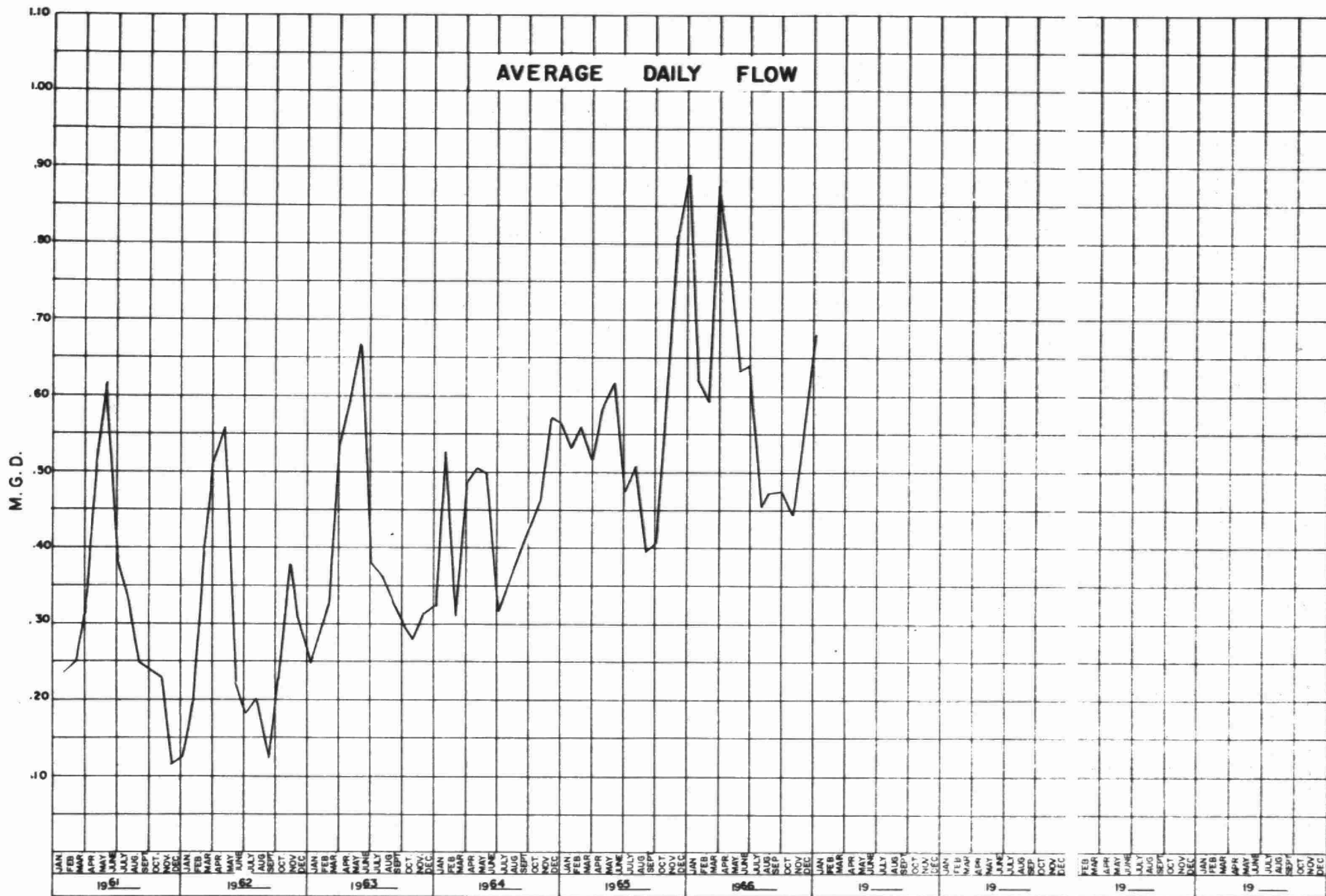
The plant by-pass diverts flows in excess of 1.0 MGD to the septic tank. Flows greater than 0.6 MGD but less than 1.0 MGD are given primary treatment.

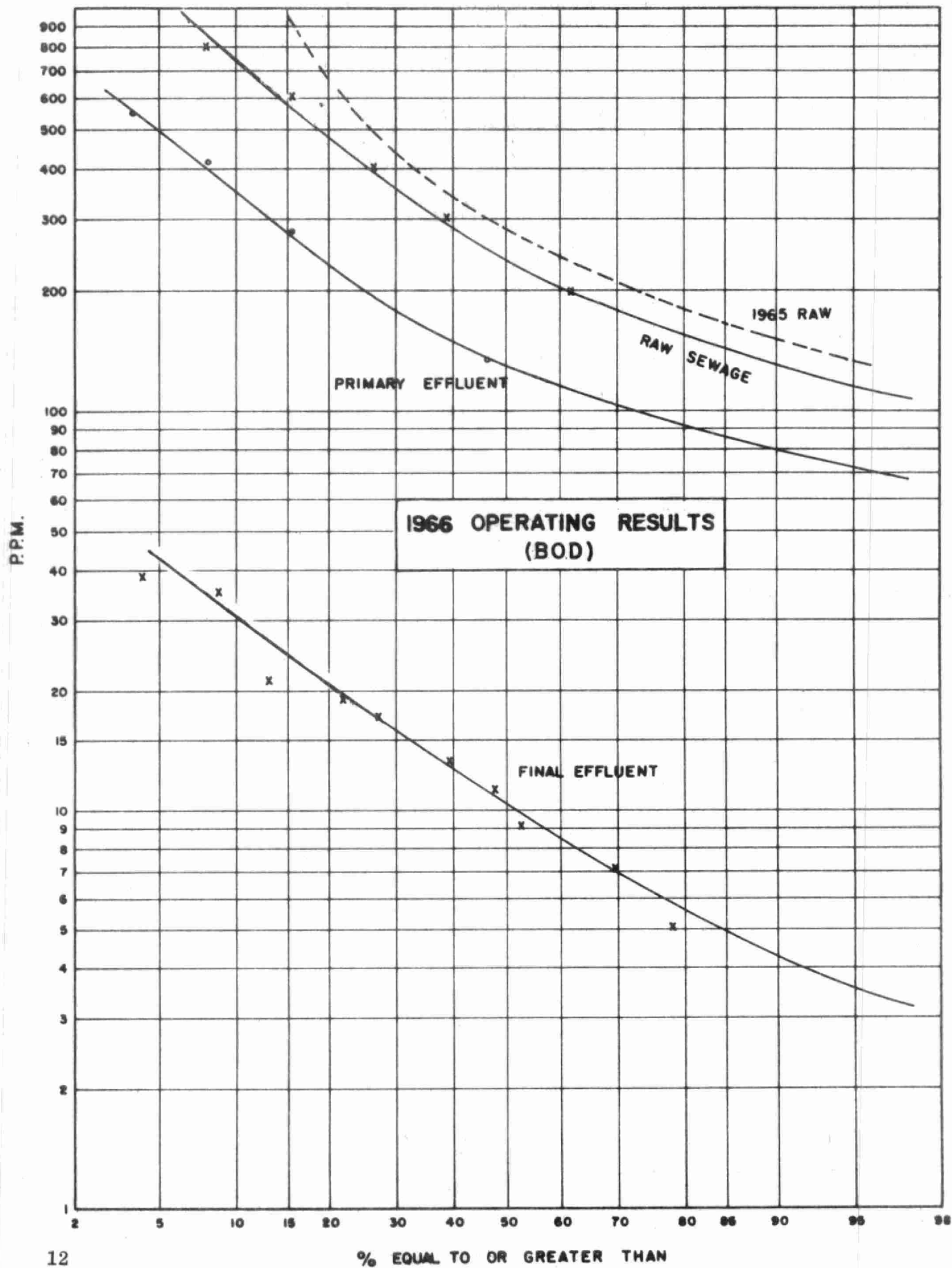
From the probability graph it can be seen that the design flow of 0.6 MGD was exceeded 43% of the time during 1966.

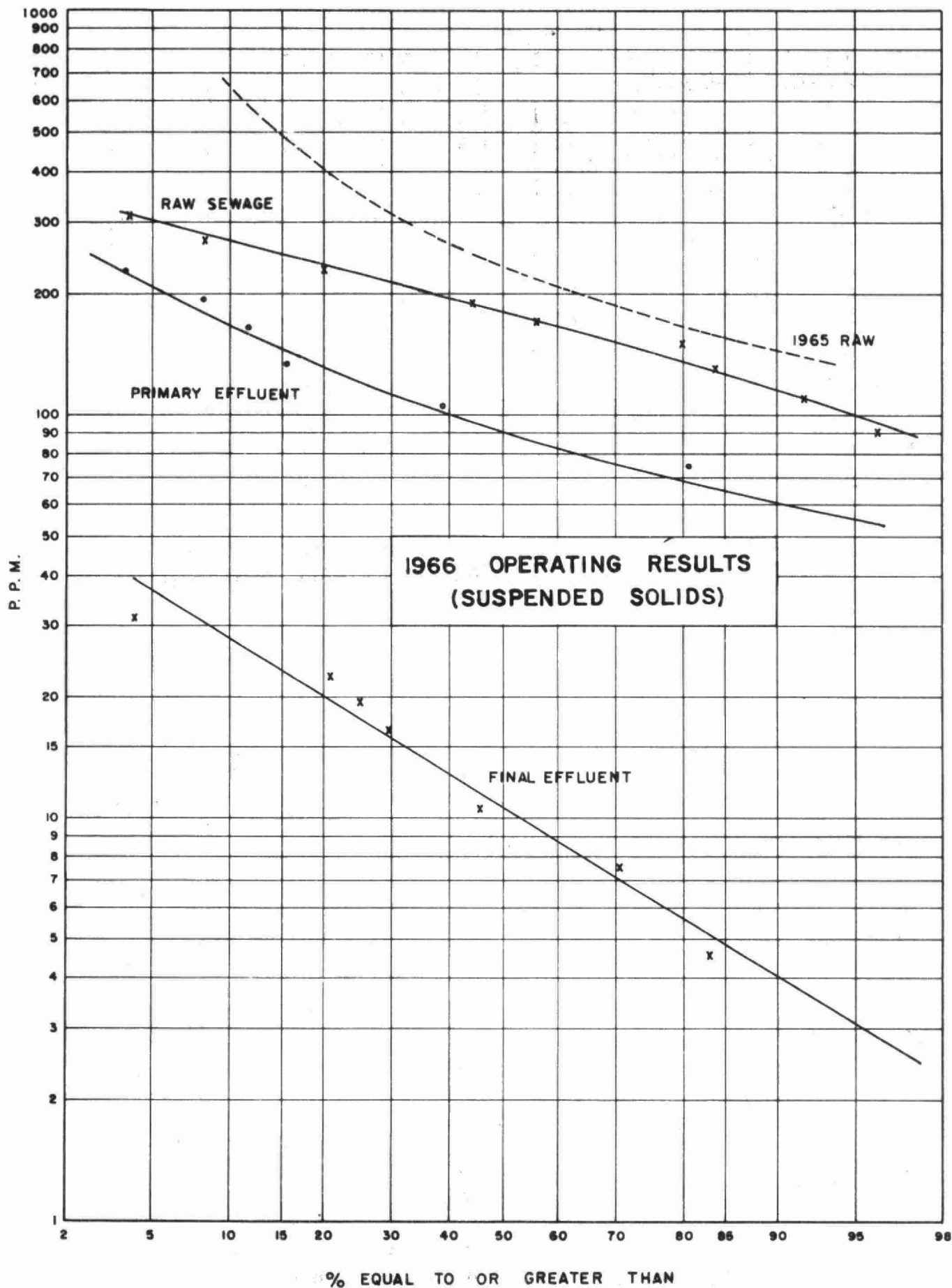
In 1965 the design flow was exceeded 35% of the time and in 1964, 22% of the time. This trend indicates that the plant is approaching its hydraulic capacity.

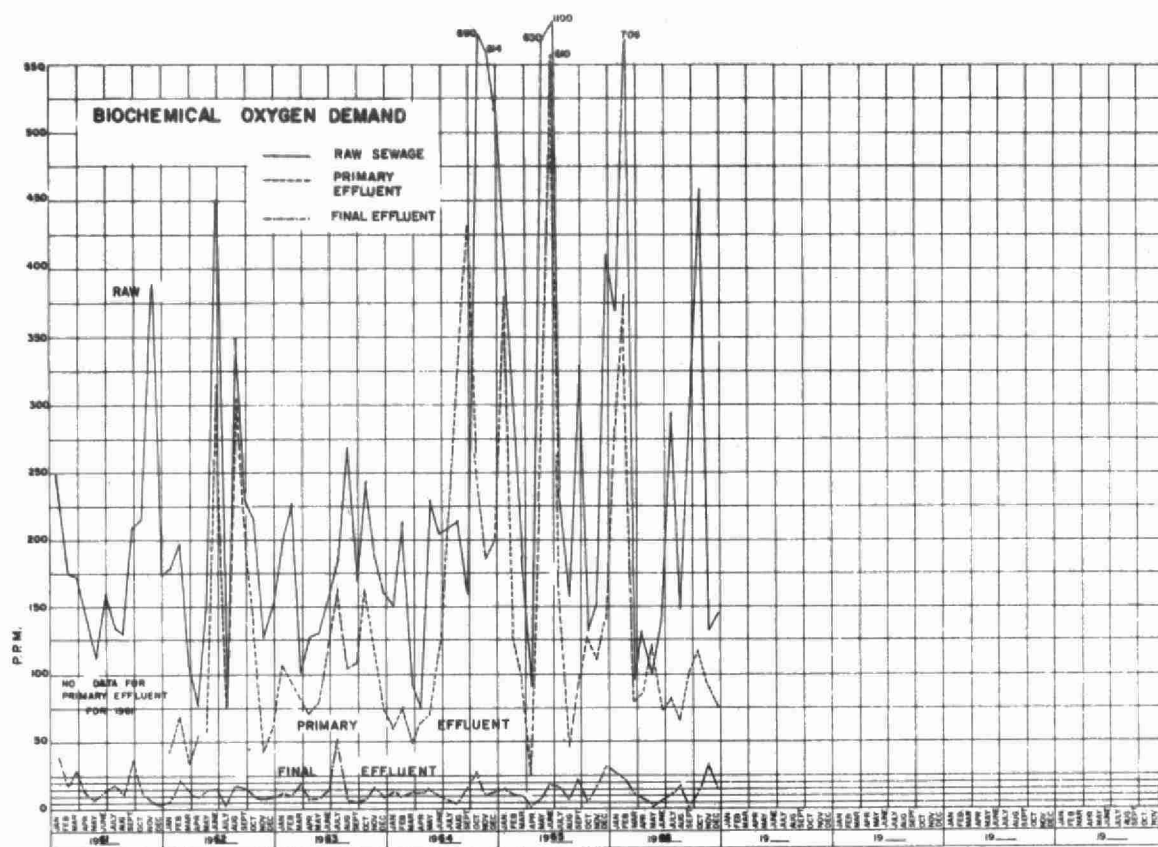
From the probability graphs it can be seen that the raw sewage BOD and suspended solids concentrations exceeded the design value for each of 200 ppm 62% and 37% of the time respectively. These values indicate that the plant was organically overloaded a large percentage of the time. This is reflected in the final effluent BOD and suspended solids concentrations, both of which exceeded the OWRC objective of 15 ppm, 33% of the time.



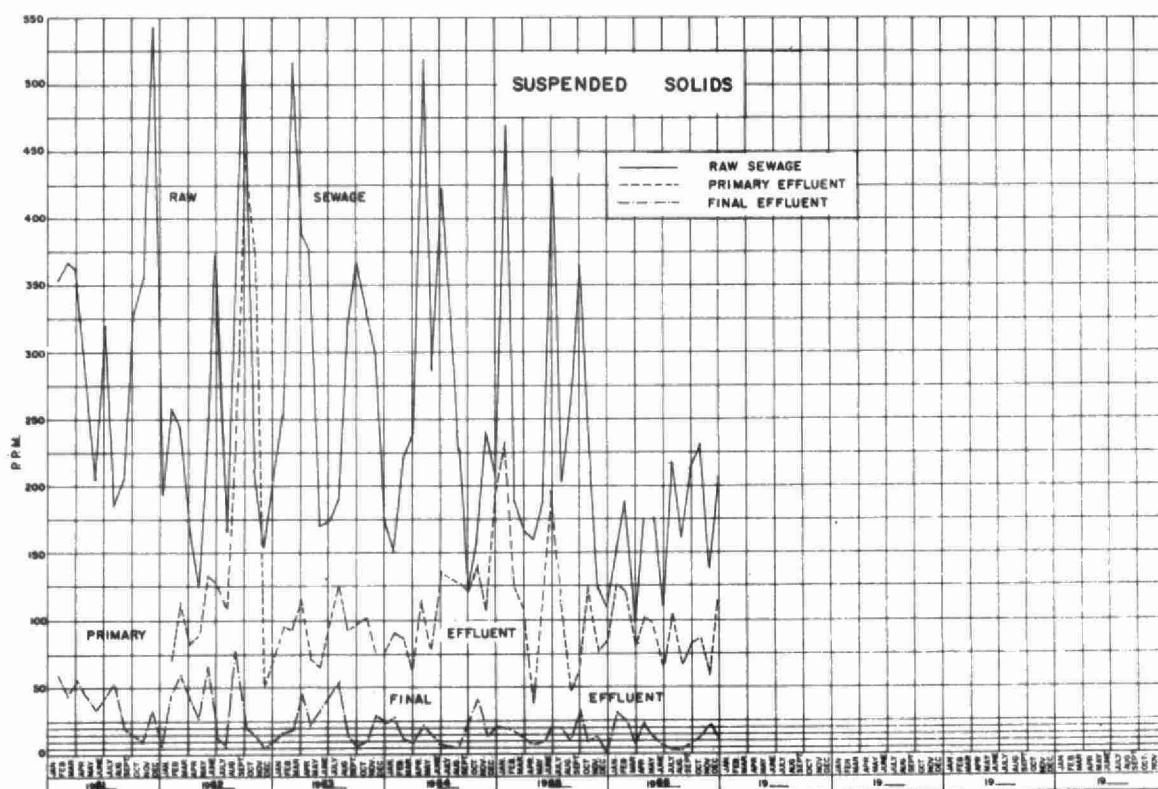








MONTHLY VARIATIONS



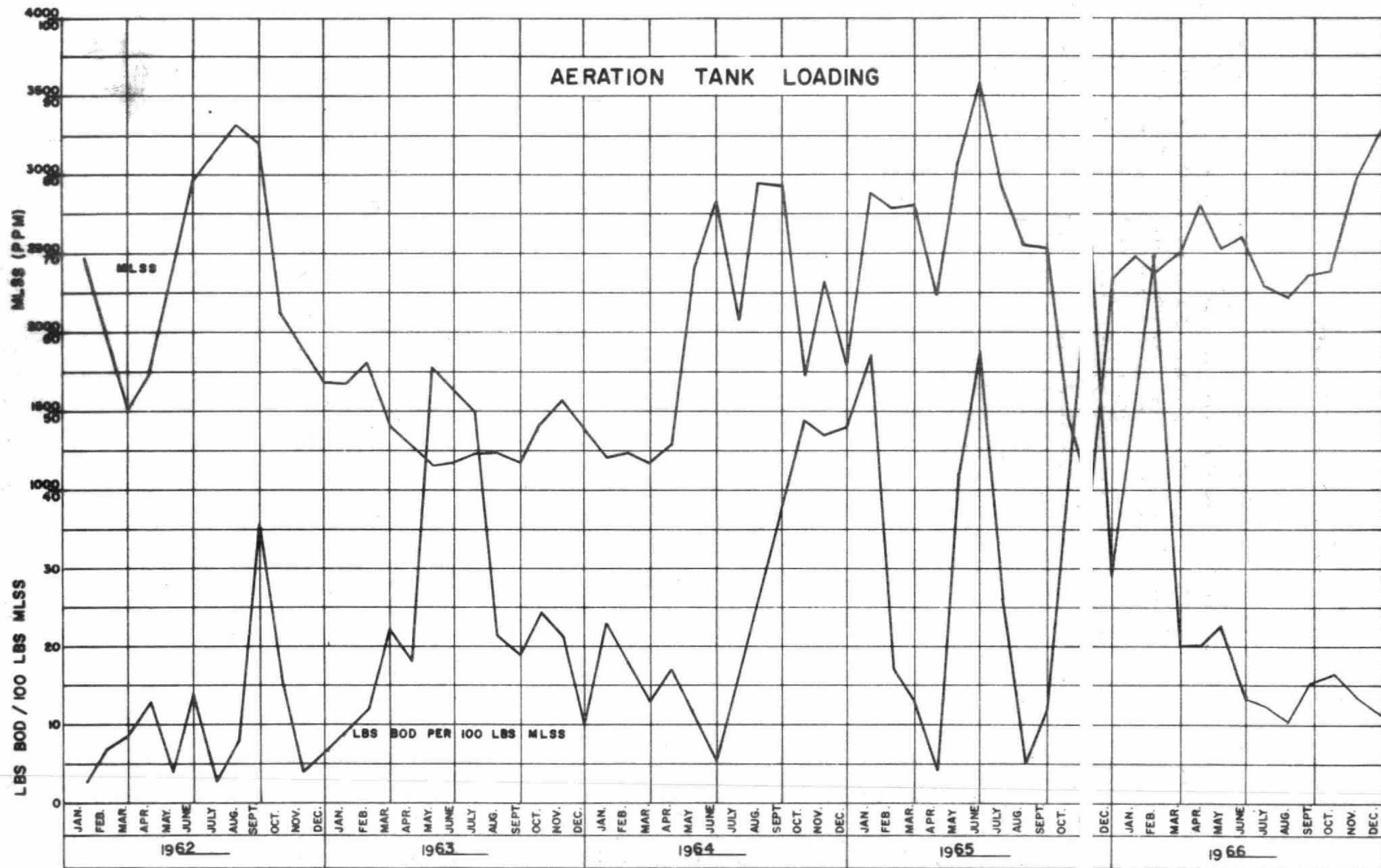
GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	370	27	92.5	32.9	153	33	78.5	11.5	11
FEB.	706	24	96.5	56.4	188	26	86.0	13.4	10
MAR.	94	12	87.0	11.1	90	8	91.0	11.1	9.5
APR.	132	9.6	92.5	14.0	176	23	87.0	17.5	8
MAY	100	3.6	96.5	9.4	182	12	93.5	16.6	7.5
JUNE	138	5.6	96.0	12.7	109	8	92.5	9.7	9
JULY	292	11	96.0	19.8	218	4	98.0	15.1	12
AUG.	147	18.6	87.5	9.4	163	4	97.5	11.6	14
SEPT.	290	4	98.5	20.4	212	8	96.0	14.6	12
OCT.	460	13	97.0	30.8	234	14	94.0	15.2	7.5
NOV.	132	34	74.0	8.2	137	22	84.0	9.6	33
DEC.	145	15	89.5	13.7	217	10	95.4	21.8	32
TOTAL	-	-	-	257.4	-	-	-	174.1	165.5
AVG.	250	15	94.0	21.4	173	14	92.0	14.5	13.8

COMMENTS

The average raw sewage BOD and SS concentrations of 250 ppm and 173 ppm were approximately equal to the design value of 200 ppm. The removal efficiency was excellent, averaging 94.0% reduction for BOD and 92% reduction for SS.

The average final effluent concentrations of 15 ppm for BOD and 14.5 ppm for SS met the OWRC objective of 15 ppm for BOD and SS concentrations.



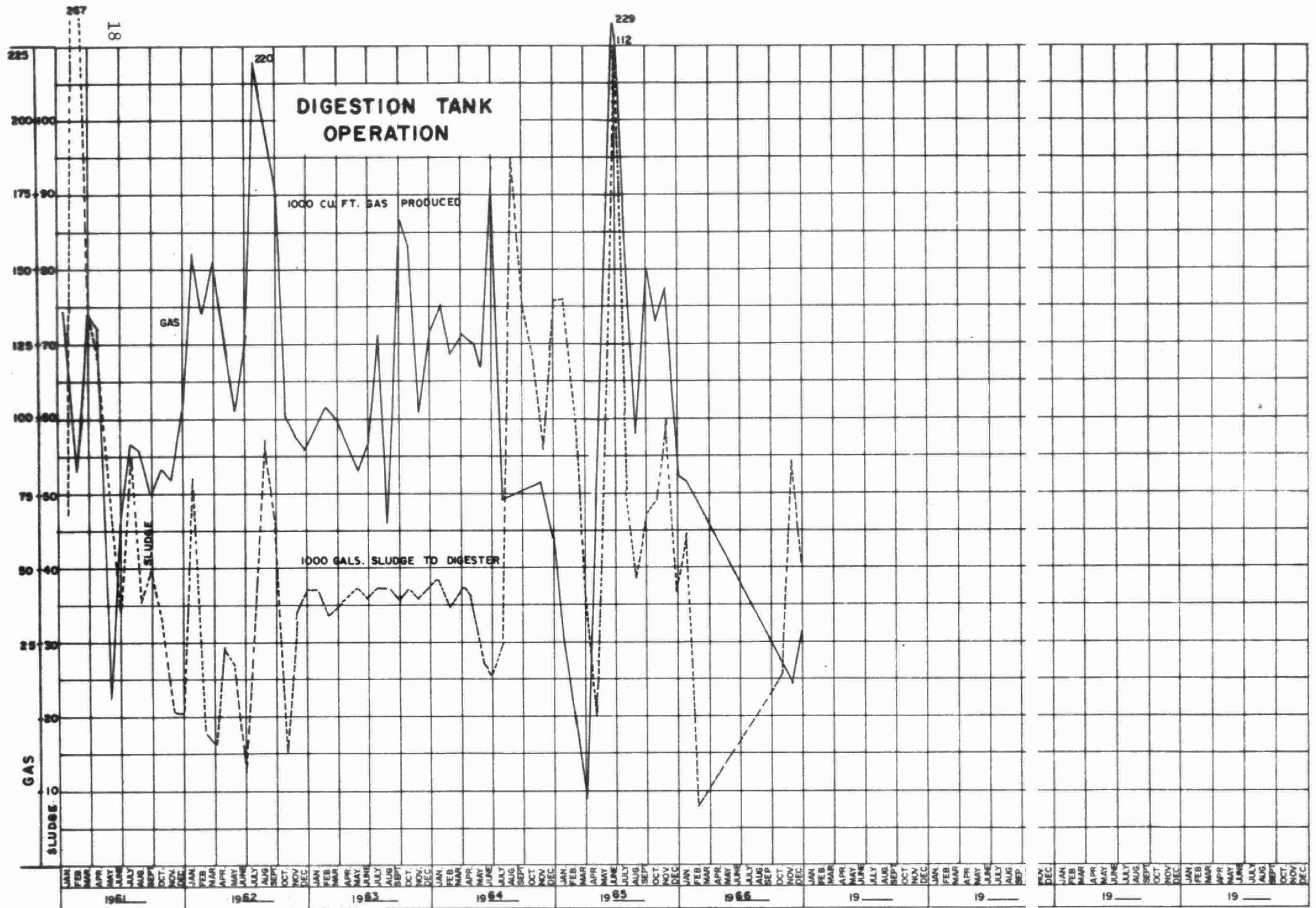
AERATION SECTION

MONTH	PRIM. EFFL B.O.D. PPM.	MLSS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.
JANUARY	285	2495	51
FEBRUARY	381	2336	70
MARCH	80	2495	20
APRIL	86	2755	17
MAY	122	2528	22
JUNE	73	2602	13
JULY	83	2276	12
AUGUST	63	2212	10
SEPTEMBER	101	2361	15
OCTOBER	119	2390	16
NOVEMBER	92	2921	13
DECEMBER	75	3255	11
TOTAL	-	-	-
AVERAGE	130	2552	22

COMMENTS

The average loading of 22 lbs. of BOD per 100 lbs. MLSS was within the recommended loading for a conventional activated sludge plant of 20-40 lbs. of BOD per 100 lbs. MLSS. However, from the table, it can be noted that during the earlier part of the year the plant was subjected to high organic loadings, caused by industrial wastes.

The mechanical aerators supplied sufficient oxygen to provide good treatment even during the periods of high organic loading.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	
JAN.	7.15	4.82	3.54	0.53	3.19	1.71	81.90
FEB.	1.28	-	-	3.24	-	-	-
MAR.	-	-	-	6.14	-	-	-
APR.	-	4.26	-	6.49	-	-	-
MAY	-	-	-	7.42	-	-	-
JUNE	-	3.69	-	7.72	-	-	-
JULY	-	-	-	7.02	-	-	-
AUG.	-	2.59	-	6.32	-	-	-
SEPT.	-	7.36	-	5.97	-	-	-
OCT.	4.16	1.81	-	4.04	-	-	-
NOV.	8.72	-	-	-	-	-	11.50
DEC.	6.14	-	-	-	-	-	34.76
TOTAL	27.45	-	-	54.89	-	-	-
AVG.	2.29	4.09	3.54	4.57	3.19	1.71	-

COMMENTS

The digester was out of service for repairs from March to September. Since the repairs entailed cleaning out the digester, there was more sludge removed in 1966 than there was added.

Rather than using the sludge drying beds, liquid digested sludge haulage was continued in 1966. This method of sludge disposal was utilized to eliminate the possibility of odourous conditions at the plant.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	19.205	1144	5.96
FEBRUARY	16.535	1095	6.62
MARCH	27.097	1027	3.79
APRIL	22.858	848	3.71
MAY	19.571	847	4.33
JUNE	19.203	558	2.90
JULY	14.127	703	4.98
AUGUST	14.614	704	4.82
SEPTEMBER	14.297	650	4.55
OCTOBER	13.780	694	5.04
NOVEMBER	16.687	821	4.92
DECEMBER	21.074	732	3.47
TOTAL	219.048	9823	-
AVERAGE	18.254	819	4.48

COMMENTS

Chlorination of the plant effluent was practiced year-round in 1966. The average dosage rate of 4.48 ppm was sufficient to maintain a chlorine residual of 0.5 ppm. It should be noted that dosage rates vary because excess flows which by-pass the plant are chlorinated before discharge to the river, and during the summer pre-chlorination of the raw sewage was practiced to reduce odour problems.



CONCLUSIONS

This report has outlined in detail the operational data for this plant during 1966. From the data presented, it can be seen that the plant periodically was organically and hydraulically overloaded. The excellent treatment efficiency experienced during the year was due to the efforts of the plant staff who worked closely with the head office staff of the Division of Plant Operations of the OWRC.

RECOMMENDATIONS

In order to ensure that the efficiency of treatment experienced during 1966 is maintained, the plant staff and the Division of Plant Operations should continue their vigilance of the plant operation.

The Town of Fergus should continue to control the industrial wastes entering the sanitary sewer system by enforcing its industrial wastes bylaw.

As the plant has reached its design load, consideration should be given to plant expansion in the immediate future.

DATE DUE		

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